Object Detection on Google Glass
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Project Overview
To design a system which can significantly increase the performance of the Exemplar Support Vector Machines (ESVM) object detection algorithm and compare it with the performance of current approaches.

Why ESVM?
- Category is good but sometimes its not necessary for task at hand.
- ESVM identifies the object and not the object’s category.
- Goes beyond detection and provides 3D metadata.

Architecture Overview

ESVM vs DPM (Deformable Part Models)

<table>
<thead>
<tr>
<th></th>
<th>ESVM</th>
<th>DPM</th>
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</thead>
<tbody>
<tr>
<td>Identifies the Object</td>
<td>Identifies Object Category</td>
<td></td>
</tr>
<tr>
<td>Provides object metadata</td>
<td>No metadata</td>
<td></td>
</tr>
<tr>
<td>Model per exemplar</td>
<td>Model per category</td>
<td></td>
</tr>
<tr>
<td>Not Scalable</td>
<td>Scalable</td>
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</tbody>
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Application Server Architecture

Challenges
- Implementing a State-manager without affecting the concurrency of the system.
- Designing an algorithm for effective task distribution amongst the cognitive engines.
- ESVM requires a lot of models for good image detection.
- Google Glass camera has a very wide angle view.

Future Work
- Use the metadata provided by ESVM for applications involving augmented reality, scene understanding and Computer graphics.
- Applications can use the system to provide personalized cognitive assistance.
- Smarter scheduling algorithm based on available resources.

Results

Expected Object Detection Time for different approaches

Takeaways
- ESVM object detection time could be brought down to a acceptable level using a distributed and adaptive setup.
- ESVM good for detection of specific objects and not for general cases.

References